

Level 1-2 – Simple questions

1. Simplify the following expressions.

(a) $2x + 3x + 4x$

(b) $3y - 8y + 2y$

2. Simplify the following expressions.

(a) $3x - y + 6x + 7y$

(b) $x - 8y - 6 + 10y - 5x + 3$

3. Solve the following equations.

(a) $2x - 5 = 11$

(b) $3x + 7 = 1$

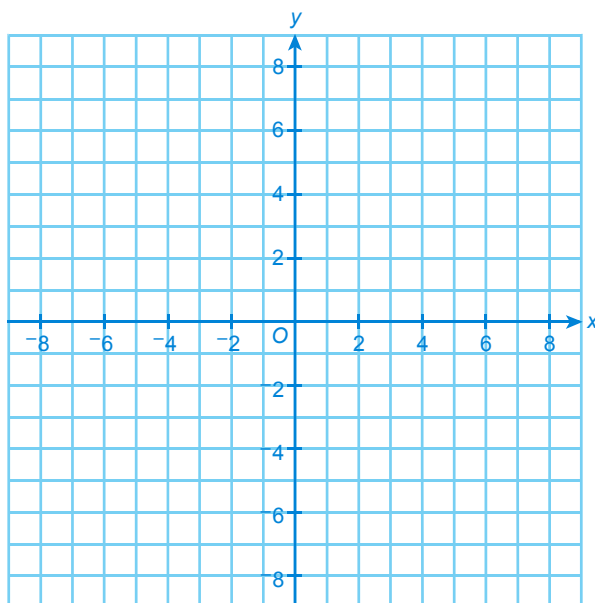
4. Arrange the following numbers in ascending order.

(a) $-8, -5, 6, -2, 1$

(b) $-2, 5, -1, 0, -\frac{1}{2}, 9$

5. Mark the following points on the rectangular coordinate plane.

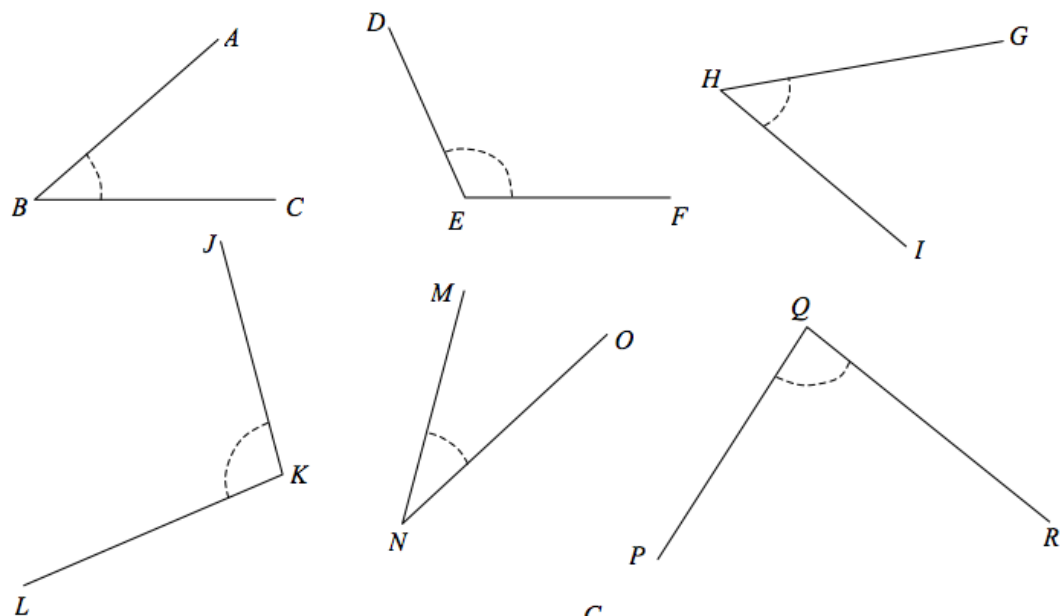
$A(1, 3), B(2, 5), C(0, 4), D(-2, 7), E(-5, -4), F(-7, 0), G(6, -7), H(4, -3)$



6. Given that $y = 3x - 5$, complete the following table.

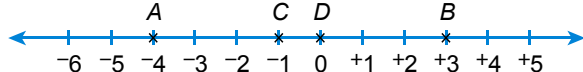
x	-3	-2	-1	0	1	2
y						

7. Measure the following angles:



8. Simplify $12 : 20$.

9. According to the number line below, find the values of points A to D.



A: _____, B: _____, C: _____, D: _____

10. Fill in the box with suitable symbols. ($>$ or $<$)



- (a) $-1 \square 1$
- (b) $0 \square -1$
- (c) $0 \square B$
- (d) $B \square -1$

11. Find the distance between each of the following pairs of A and B .

(a) $A(0, 1), B(0, 9)$

(b) $A(-2, 0), B(3, 0)$

(c) $A(4, 5), B(-2, 5)$

Level 3-4 – More Complex Questions

12. Simplify $\frac{3}{2} \div \frac{12}{7}$.

13. The following table shows the scores of S2C students in a Mathematics quiz (full score is 20).

Score	Frequency
1 - 5	3
6 - 10	7
11 - 15	18
16 - 20	12

- (a)** Find the second class interval.
- (b)** Find the upper class limit of the first class interval.
- (c)** How many students have scores less than 5.5?
- (d)** Find the lower class limit of the third class interval.
- (e)** How many students are there in S2C?

14. Mary and Gilbert have \$1 500 in total. If Mary has $\$8x$, express the amount got by Gilbert by using an algebraic expression.

15. The number of stickers Anna got is 3 times that of Ada's. They have 164 stickers in total. How many stickers does Ada have?

16. Given that $x = 5 - 4y$, complete the following table.

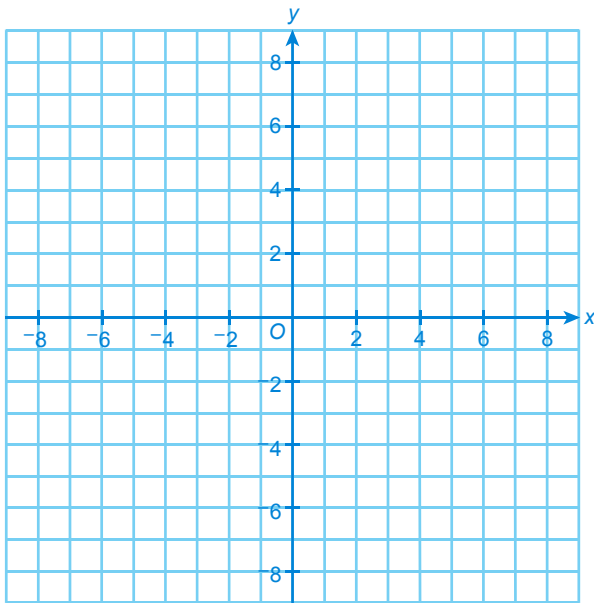
x							
y	-3	-2	-1	0	1	2	3

17.

(a) Given that $y = 2x + 5$, complete the following table.

x	-3	-1	0	1	2	4
y						

(b) Draw the graph of $y = 2x + 5$ from $x = -3$ to $x = 4$ on a rectangular coordinate plane.



18. If the graph of $y = 8x - 4$ cuts the x -axis and the y -axis at points A and B respectively, find the coordinates of A and B .

19. The ratio of the selling prices of two computers is $2 : 3$. If the selling price of the less expensive computer is \$8 400, find the selling price of the more expensive one.

20. A car travels 810 km in 9 hours, while a train travels 576 km in 6 hours. Which vehicle has a higher speed?

21. If $x = -4$, find the values of the following expressions.

(a) $x^2 - 6$

(b) $\frac{3x + 7}{x}$

22. Solve the equation $\frac{x}{2} - 3 = 10$.

23. Solve the equation $\frac{4}{5}x - 8 = \frac{1}{2}$.

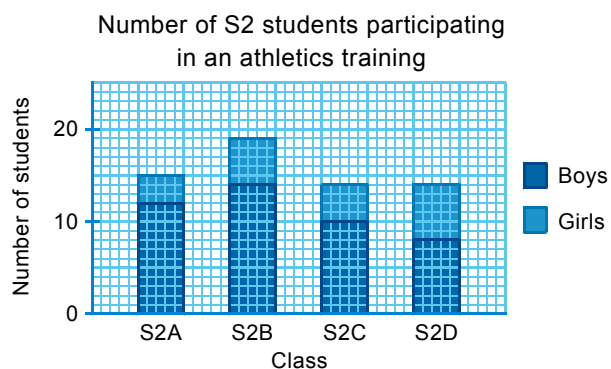
24. Solve the equation $7 - 3x = 4x + 21$.

25. Simplify $1 \text{ km} : 25 \text{ cm}$.

26. Simplify $\frac{5}{4} : \frac{7}{2}$.

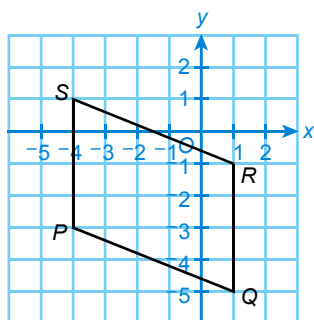
27. Simplify $0.24 : 3.6 : 0.48$.

- 28.** The following compound bar chart shows the number of S2 students participating in an athletics training.

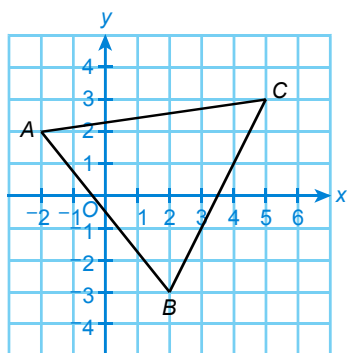


- (a) Which class has the largest number of students participating in the athletics training?
- (b) How many students participate in the training in that class?
- (c) How many of them are boys?
- (d) Which class has the largest number of girls participating in the athletics training?
- (e) How many girls participate in the training in that class?

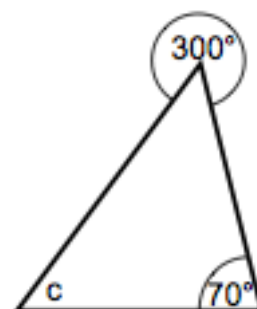
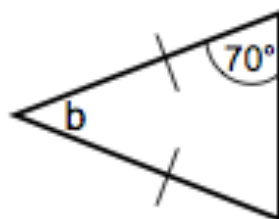
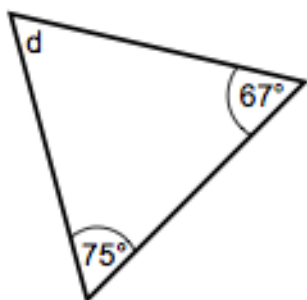
- 29.** Find the area of parallelogram $PQRS$ in the figure.



- 30.** Find the area of $\triangle ABC$ in the figure.



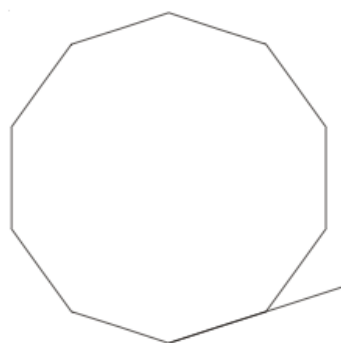
31. Work out the size of the angles marked with letters.



32.

a) Name the regular polygon, above.

b) Work out the size of an **exterior** angle and of an **interior** angle for this polygon.

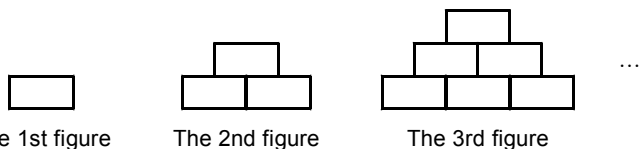


33. Evaluate the following.

(a) $(-2)(5) + (-3)(-6)$

(b) $(-12) \div (-4) - (-27) \div (-3)$

34. The following is a sequence of figures.



(a) Complete the following table.

Order of figures	1	2	3	4	5
Number of bricks					

(b) What kind of sequence is formed by the number of bricks?

Level 5-6 – Challenging questions

35. If $p = -\frac{1}{2}$ and $q = 4$, find the values of the following expressions.

(a) $(q-1)(q+1)$

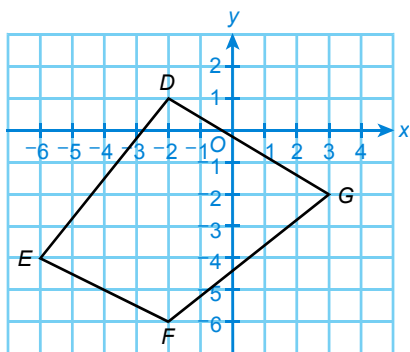
(b) $p^2 - 2pq + q^2$

36. It is given that $T = (x^2y - 60)(1 + 2xy^n)$. If $x = 3$, $y = 4$ and $n = 2$, find the value of T .

37. Solve the equation $\frac{y-7}{4} - 27 = -32$.

38. Solve the equation $\frac{2y-5}{3} = -2$.

40. Find the area of quadrilateral $DEFG$ in the figure.



41. The following stem-and-leaf diagram shows the ratings of a government officer given by a group of people.

Ratings of a government officer
given by a group of people

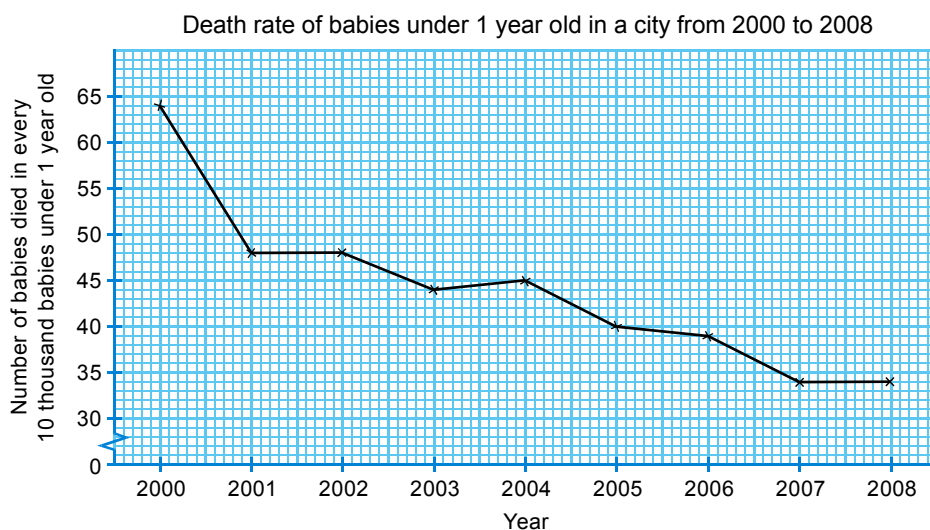
Stem (tens)	Leaf (units)
4	5 9
5	0 2 5 9
6	0 0 0 5 5 9
7	0 0 5 5 5
8	0 0 0 0 5
9	0 5 9

(a) How many people have given the government officer a rating of 70?

(b) How many people have given ratings lower than 60?

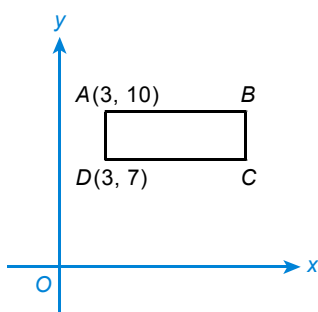
(c) What percentage of these people have given ratings higher than 80?

42. The following broken-line graph shows the death rate of babies under 1 year old in a city from 2000 to 2008, where the vertical axis shows the number of babies died in every 10 thousand babies under 1 year old.



- (a) Write down the number of babies died in every 10 thousand babies under 1 year old in 2005.
- (b) Describe the trend of the number of babies who died before 1 year old from 2000 to 2008.
- (c) Which of the following is the most possible number of babies died in every 10 thousand babies under 1 year old in 2009? Explain briefly.
- (i) 50 (ii) 40 (iii) 30
43. The remaining values of the Octopus cards of Alice, Bonnie, Calvin and Derek are $-\$30$, $-\$34$, $\$0$ and $\$33$ respectively.
- (a) Whose Octopus card has the highest remaining value?
- (b) Whose Octopus card has the lowest remaining value?
- (c) When the remaining value of the Octopus card is zero or negative, it cannot be used for payment. If these four people take the tram together, whose Octopus card cannot be used for paying the fare?
44. Write down an algebraic expression to represent the n th term of each sequence.
- (a) 1, 4, 7, 10, ... (b) 5, 3, 1, -1 , ...

45. The figure shows rectangle $ABCD$ where $AB = 3AD$.



- (a) Find the length of AD . Hence find the length of AB .
- (b) Find the perimeter of rectangle $ABCD$.
- (c) Find the coordinates of B and C .

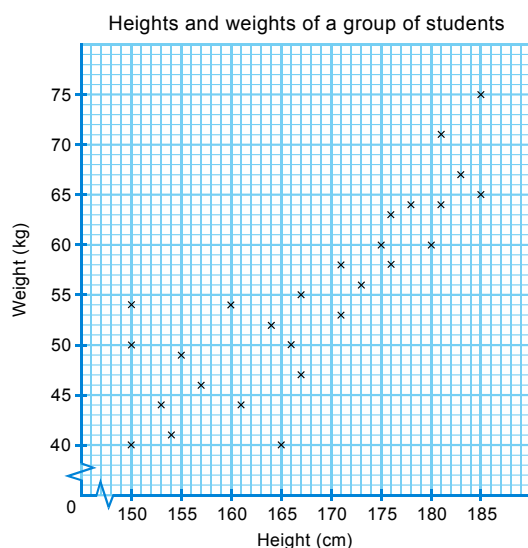
46.

(a) The following table shows the heights of S2B boys. Complete the table.

Height (cm)	Lower class boundary (cm)	Upper class boundary (cm)	Class mark (cm)	Frequency
150 - 154	149.5			4
155 - 159			157	7
160 - 164				6
165 - 169		169.5		3

(b) How many boys are there in S2B?

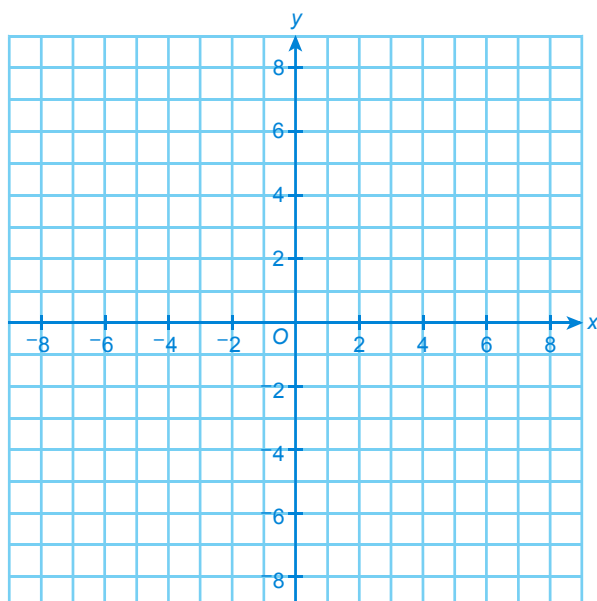
47. The following scatter diagram shows the heights and weights of a group of students.



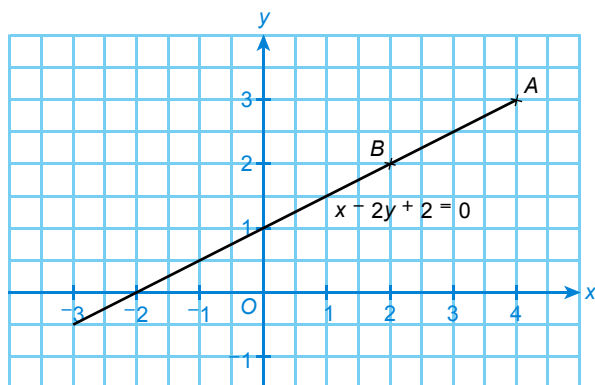
(a) Are the taller students heavier?

(b) For the students with heights less than 170 cm, describe the relation between their heights and weights.

48. Draw the graph of $2x + y = 7$ from $x = -2$ to $x = 3$ on a rectangular coordinate plane.



49. The following figure shows the graph of $x - 2y + 2 = 0$ from $x = -3$ to $x = 4$.



- (a) Write down the coordinates of points A and B .
 (b) Write down the coordinates of the point at which the graph cuts
 (i) the x -axis.
 (ii) the y -axis.
 (c) Does $(1, 1.5)$ satisfy the equation $x - 2y + 2 = 0$?

50. Simplify $1.75 : 1\frac{2}{3}$.

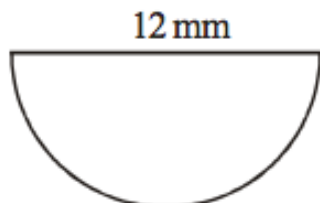
51. Janice and Steven share the amount of \$1 200. If Janice's share is 3 times of Steven's,

(a) find the ratio of Janice's and Steven's share.

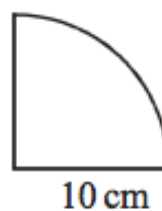
(c) how much does Janice get?

52. Work out the perimeter of the following shapes, taking π to be 3.14.

a)



b)



53. The sizes of the angles, in degrees, of the quadrilateral are

$$x + 10$$

$$2x$$

$$x + 80$$

$$x + 30$$

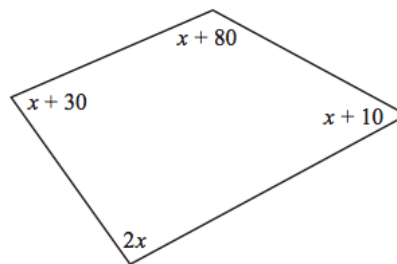
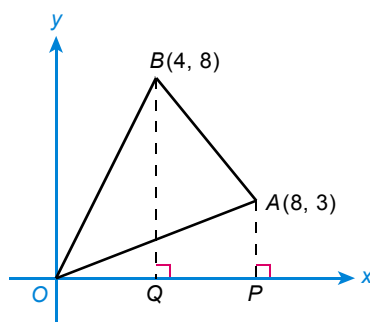


Diagram **NOT**
accurately drawn

a) Use this information to write down an equation in terms of x .

b) Use your answer to part (a) to work out the size of the smallest angle of the quadrilateral.

54. According to the figure below,



(a) find the area of $\triangle OBQ$.

(b) find the area of $\triangle OAP$.

(c) find the area of trapezium $BAPQ$.

(d) find the area of $\triangle OAB$.

55. Evaluate the following.

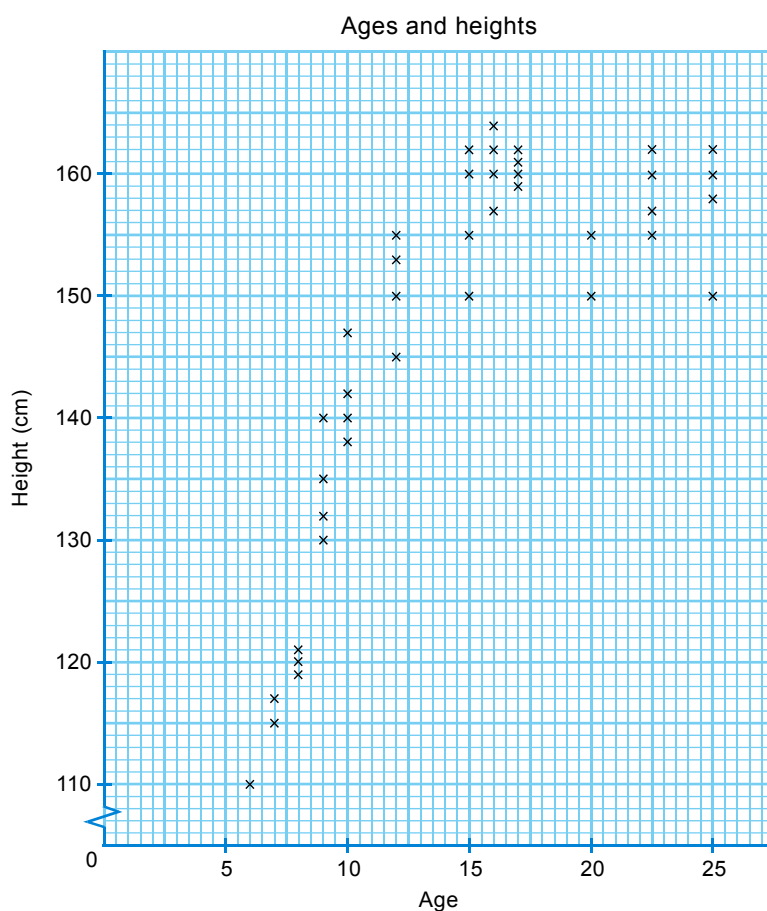
(a)
$$\frac{-2}{0 + (-3)}$$

(b)
$$-\left[\frac{-2}{0 + (-3)}\right] \times \frac{-9}{2} \div \frac{-3}{7}$$

56. Solve the equation $\frac{7[4 - 3(2x - 6)]}{3 - (-2)} = 35$.

57. Solve the equation $\frac{2x - 1}{6} + \frac{2x + 1}{9} + \frac{x - 4}{15} = \frac{5}{6}$.

58. The following scatter diagram shows the ages and heights of a group of female interviewees.



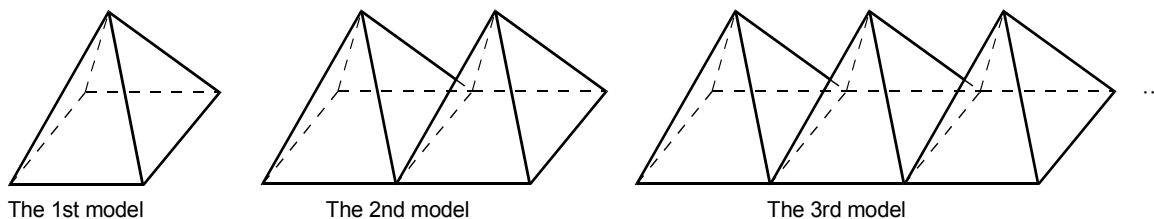
(a) What are the ages of the eldest and the youngest interviewees?

(b) What is the age of the tallest interviewee?

(c) For the interviewees with ages below 15, what is the relation between their ages and heights?

(d) For the interviewees with ages above 15, what is the relation between their ages and heights?

59. Here is a series of patterns formed by sticks.

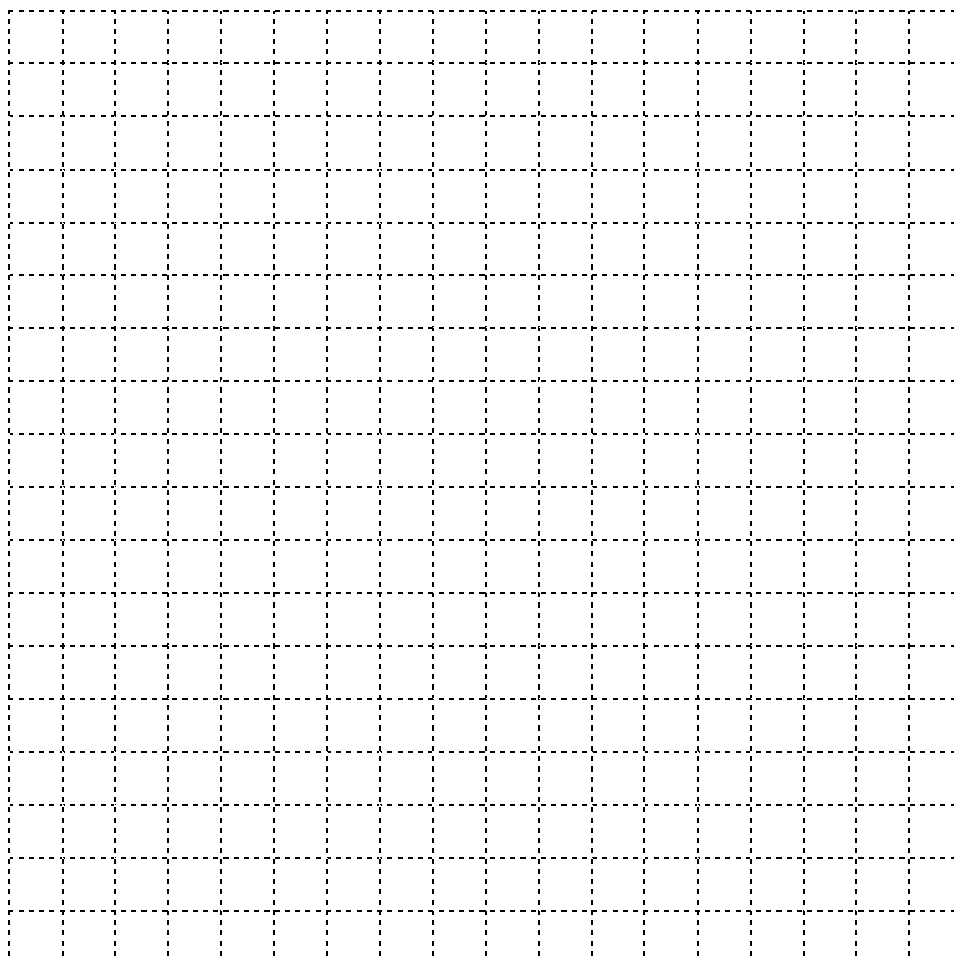


(a) According to the above pattern, complete the table below.

Order of models	1	2	3	4	5
Number of sticks					

(b) Write an equation in x and y where y represents the number of sticks in the x th model.

(c) Draw the graph of the equation obtained in (b) from $x=1$ to $x=5$ on a rectangular coordinate plane.

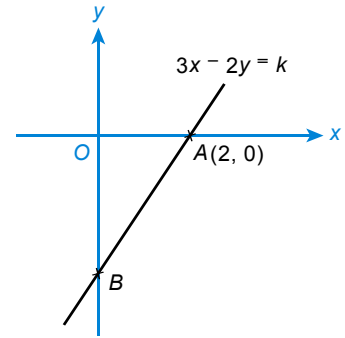


60. In the figure, the graph of $3x - 2y = k$ passes through $A(2, 0)$ and cuts the y -axis at point B .

(a) Find the value of k .

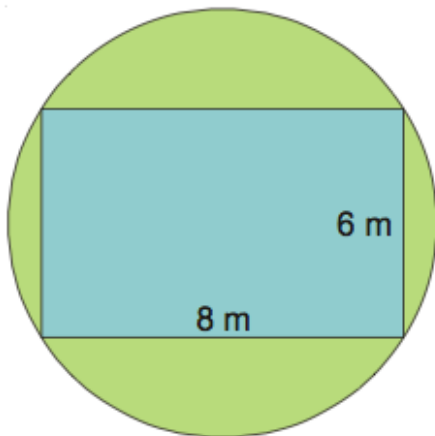
(b) Find the coordinates of B .

(c) Find the area of $\triangle AOB$.



61. The diagram shows a circular garden comprising a rectangular pond enclosed by grass. The circular garden has a diameter of 10 m. The rectangular pond measures 8 m by 6 m.

Work out the area of the garden covered in grass. Take π to be 3.14 and give your answer to the nearest m^2



62. On a map with a scale of 1 : 500, the sides of a square pool are x each.

(a) Find the actual length of the pool in terms of x .

(b) Find the actual area of the pool in terms of x .

(c) Find the ratio of the area of the pool on the map to its actual area.

